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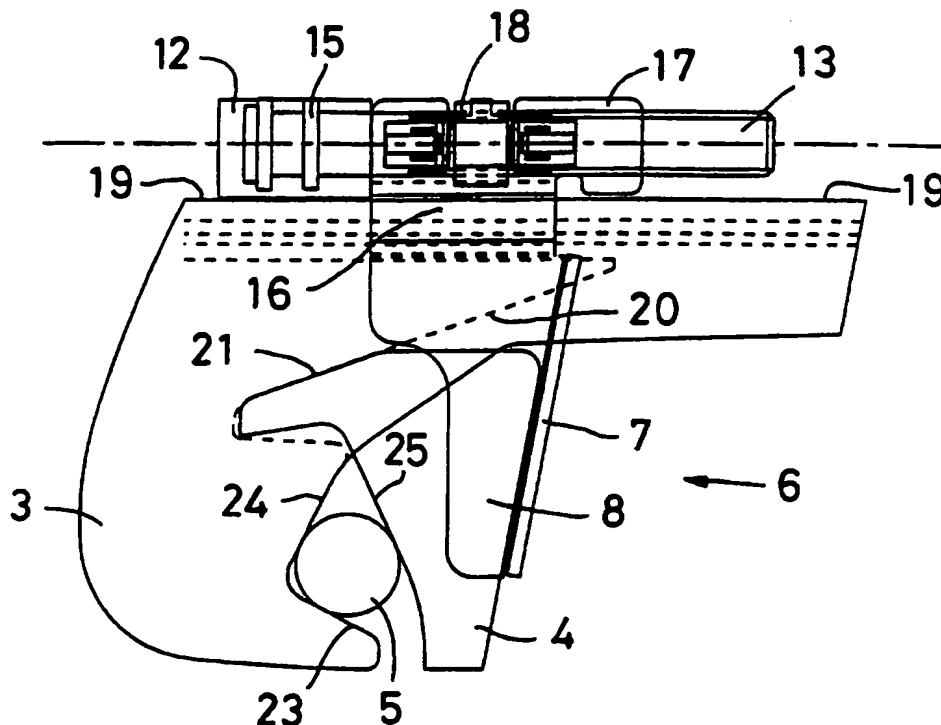
With international search report.

(54) Title: A RAILING BRACKET

(57) Abstract

An apparatus for securing a load carrier strut extending transversely over a vehicle roof in railings (5) which are disposed in the longitudinal direction of the vehicle. The apparatus includes two clamping jaws (3, 4) which are reciprocal towards and away from one another along the load carrier strut under the action of a clamping device and which are provided with clamping surfaces (23-25) for engagement against the railing (5). The clamping device is designed to lock the clamping jaws in optional positions along the load carrier strut. A guide portion (6) is connected, for its displacement along the load carrier strut (1), to the clamping device and has a guide surface (7) for cooperation with one clamping jaw (4) so that this is movable transversely of the load carrier strut (1) towards and away from it. The other

clamping jaw (3) has a ramp surface (20) approximately extending along the longitudinal direction of the load carrier strut and making an angle with this longitudinal direction. The ramp surface is disposed for cooperation with a first clamping jaw (4) and displacement thereof transversely of the longitudinal direction of the load carrier strut on mutual relative movement of the clamping jaws in the longitudinal direction of the load carrier strut.



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A RAILING BRACKET

TECHNICAL FIELD

- 5 The present invention relates to an apparatus for securing a load carrier strut, extending transversely over a vehicle roof, in so-called railings disposed along opposing side edge regions of the vehicle roof and in the longitudinal direction of the vehicle, and comprising two clamping jaws reciprocally movable in relation to one another along the load carrier strut
- 10 under the action of a clamping device, the clamping jaws having clamping surfaces in engagement with the railing, the clamping device being designed for locking the clamping jaws in optional positions along the load carrier strut.

15 BACKGROUND ART

- A railing bracket of the type mentioned by way of introduction is disclosed in WO94/21490. This railing bracket has two clamping jaws which are displaceable in the longitudinal direction of a load carrier strut both together
- 20 along the load carrier strut and mutually in relation to one another. Inside the load carrier strut, there is disposed an operating device for the movement and locking of the clamping jaws.

- The clamping jaws have mutually facing clamping surfaces for cooperation
- 25 with a railing bar. These clamping surfaces incline in relation to the normal to the longitudinal direction of the load carrier strut so that the lower ends of the clamping surfaces are located considerably closer to one another than their upper ends. The clamping surfaces are substantially straight.

- 30 A railing bracket of this type may be employed on railing profiles of varying cross sections, since the aperture which the two clamping surfaces together define is powerfully undercut. However, there is the serious drawback that, if the bracket is applied on a railing profile of slight cross section (e.g. a slim tube), the load carrier strut will be located very close to the upper side of the railing while, on the other hand, the distance will be considerably greater if
- 35 the bracket is applied on a railing profile of larger cross section.

EP 0 503 305 A1 shows a railing bracket of approximately the same fundamental type as that mentioned by way of introduction. However, this railing bracket is designed in such a manner that it may only be employed together with a single railing profile type.

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PROBLEM STRUCTURE

The present invention has for its object to design the railing bracket intimated by way of introduction such that it will be universally applicable, substantially regardless of the configuration of the cross section of the railing, and also its size. The present invention also has for its object to realise a railing bracket in which the position of the load carrier strut in the vertical direction varies as slightly as possible regardless of the size of the cross sectional configuration of the railing profile. The present invention yet further has for its object to realise a railing bracket which is simple and economical to manufacture and which affords reliable function and simple operation.

SOLUTION

20

The objects forming the basis of the present invention will be attained if the construction intimated by way of introduction is characterized by a guide portion which, for its displacement along the load carrier strut, is connected to the clamping device, and which has guide surfaces for cooperation with the one clamping jaw so that this is movable transversely of the load carrier strut towards and away from the strut.

Further advantages will be attained according to the present invention if its subject matter is also given one or more of the characterizing features as set forth in appended subclaims 2 to 13.

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BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

The present invention will now be described in greater detail hereinbelow, with reference to the accompanying Drawings. In the accompanying Drawings:

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- Fig. 1 is a vertical side elevation of the railing bracket with a portion of a load carrier strut, seen in the longitudinal direction of a vehicle;
- 5 Fig. 2 shows the railing bracket according to Fig. 1, seen from the end of the load carrier strut, the security endpiece of the load carrier strut having however been removed;
- 10 Fig. 3 is a view in the same direction as that of Fig. 1 with a railing profile intimated and the load carrier strut removed;
- Fig. 4 is a view corresponding to that of Fig. 3 in which the railing bar is of circular cross section and slight diameter; and
- 15 Fig. 5 is a view corresponding to that of Fig. 4 in which the railing bar is of circular cross section and with greater diameter.

DESCRIPTION OF PREFERRED EMBODIMENT

- 20 In Fig. 1, reference numeral 1 relates to a load carrier strut which is intended to be secured on railings which are disposed longitudinally at the opposing side edge regions of a vehicle. In such instance, the load carrier strut is transversely directed in relation to the longitudinal direction of the vehicle and extends over the railings and the roof of the vehicle. The load carrier
- 25 strut 1 has an endpiece 2 which, while not being apparent from the Drawings, may include a lock and also an operating device for operating a clamping device which will be described in greater detail below. The bracket includes two mutually reciprocal clamping jaws 3 and 4, in which the clamping jaw 3 may be considered as the outer clamping jaw, and the
- 30 clamping jaw 4 as the inner. The clamping jaws are also jointly movable along the load carrier strut 1 and have portions which extend into the load carrier strut via a slot-shaped aperture 11 (see Fig. 2) provided in the underside of the strut. Reference numeral 5 intimates in Fig. 1 the cross-sectional configuration of the longitudinal railing bar, and it will be apparent
- 35 that this cross-sectional configuration is complicated, has an upwardly open undercut recess, and a cross-sectional configuration which may be described

as approximately oval.

The bracket according to Fig. 1 further includes a guide portion 6 which is connected to a clamping device which will be described in greater detail below, and which is located interiorly in the load carrier strut 1. In horizontal section, the guide portion 6 is approximately U-shaped, where the bottom surface of the U forms a support surface 7 for the inner clamping jaw 4. The clamping jaw 4 is movable in the vertical direction towards and away from the load carrier strut 1 in a direction which is transverse to the strut but which suitably deviates somewhat from the normal. For this reason, the support surface 7 is somewhat obliquely inclined so that its lower surface is located more distally from the longitudinal centre line of the vehicle than its upper end. The inner clamping jaw 4 is further guided in the lateral direction (in the longitudinal direction of the vehicle) by being accommodated between the approximately parallel shanks 8 of the U-shaped cross section. The arrow 9 illustrates the two-directional movement capability of the inner clamping jaw 4 in relation to the guide portion 6.

Fig. 2 shows the bracket seen in the longitudinal direction of the load carrier strut 1 in towards the longitudinal centre line of the vehicle. It will be apparent from the Figure that the outer clamping jaw 3 has a narrow neck portion 10 which extends through the slot-shaped aperture 11 in the underside of the load carrier strut 1. Above the neck portion 10, the outer clamping jaw 3 has an anchorage 12 for a screw 13 (see also Fig. 3). At its end, the screw 13 has engagement means 14 to be able to be rotated under the action of a suitable torque tool. The engagement means may ideally be designed as a channel extending along the screw and being of non-rotational symmetric cross section. In the Drawing, a square cross section is shown, but this could just as well be, for example, hexagonal. In the embodiment illustrated in Fig. 2, a square rod functions as the torque tool, this being insertable in the aperture and being secured in the endpiece 2 (Fig. 1).

The screw 13 is rotary in relation to the anchorage 12 but is axially fixed therein by having at least one projecting flange 15 which is accommodated in a corresponding groove in the anchorage, the groove being transversely directed in relation to the longitudinal direction of the screw.

It will be apparent from Fig. 3 that the guide portion 6 has a neck portion 16 corresponding to the neck portion 10 of the outer clamping jaw 3. This neck portion 16 also extends up through the slot-shaped aperture 11 in the underside of the load carrier strut 1. Interiorly in the load carrier strut, the guide portion 6 has two registering plates 17 which, in the vertical direction, abut against corresponding defining surfaces in the load carrier strut 1. Hereby, the guide portion 6 will be displaceable in a sliding guide in relation to the load carrier strut 1. The plates 17 also serve as an anchorage for a nut 18 which meshes with the screw 13. The nut is fixed in relation to the plates 17 in the longitudinal direction of the screw and is non-rotatably secured between the two opposing plates.

The anchorage 12, the screw 13, the nut 18 and the two plates 17 may be considered as a clamping device whose purpose is to reciprocally displace the two clamping jaws 3 and 4 so that a railing bar 5 may be fixedly clamped between them. In the open state, the clamping device also allows both of the jaws jointly to be slid in the longitudinal direction of the load carrier strut.

It will jointly be apparent from Figs. 1 and 3 that the outer clamping jaw 3 has, in the longitudinal direction of the load carrier strut 1, a long, upper support surface 19 for the load carrier strut 1. On the other hand, the guide portion 6 has, in the longitudinal direction of the load carrier strut 1, a short contact surface against the load carrier strut. On tightening of the clamping device this implies that the guide portion 6 will be obliquely inclined somewhat in relation to the load carrier strut and will be clamped against the strut by a "jammed drawer effect". In order to reinforce this clamping action, the support portion may, on its upper side, have grooves or projections which improve engagement with the underside of the load carrier strut.

As was mentioned above, the inner clamping jaw 4 is movable in the vertical direction in relation to the guide portion 6. In order to realise such vertical movement, the outer clamping jaw 3 has a ramp surface 20 which is intended for cooperation with an obliquely inclined surface 21 on the inner clamping jaw 4. In their cooperation position, the ramp surface 20 and the obliquely inclined surface 21 lie against one another and are parallel. The ramp surface makes an acute angle with the longitudinal direction of the

load carrier strut and is located more proximal the load carrier strut at its end facing towards the inner clamping jaw than is the case at its end facing away from the inner clamping jaw. The angle between the ramp surface 20 and the longitudinal direction of the load carrier strut lies in the range of 10 to 35° and may, in one preferred embodiment, be approximately 20°.

As a result of the above described oblique inclination of the ramp surface 20, the inner clamping jaw 4 will be displaced in a downward direction when the clamping jaws 3 and 4 are moved towards one another. This is clearly illustrated by Figs. 4 and 5 where the bracket is applied on a slim, cylindrical railing in Fig. 4 and a thick, cylindrical railing bar in Fig. 5. In Fig. 4, the lower end of the inner clamping jaw 4 lies in the same vertical position as the lower end of the outer clamping jaw 3. On the other hand, in Fig. 5 the inner clamping jaw 4 is located higher than the lower end of the outer clamping jaw 3. This is clearly apparent from the broken line 22.

It will be particularly apparent from Figs. 4 and 5 that the two clamping jaws have mutually facing clamping surfaces which, together, form an accommodation space for the railing bar. This accommodation space may be generally described as approximately triangular in cross section, the apex of the triangle being turned to face upwards.

The clamping surface of the outer clamping jaw 3 includes a lower portion 23 which serves the function of a base in the above-mentioned triangle. This lower portion makes an acute angle with the longitudinal direction of the load carrier strut so that its inner end is located more distally from the load carrier strut than its outer end. The angle may suitably lie in the range of between 10 and 40°. Further, the clamping surface of the outer clamping jaw 3 has an outer portion 24 which is obliquely inclined in relation to the longitudinal direction of the load carrier strut 1. This oblique inclination is such that the outer portion of the clamping surface has a lower end which is located considerably more distal from the longitudinal centre line of the vehicle than the upper end of the clamping surface. The angle between the outer clamping portion or surface 24 and the longitudinal direction of the load carrier strut may lie in the range of between 40 and 70°. The inner clamping jaw 4 also has a clamping surface 25 which makes an angle with

the longitudinal direction of the load carrier strut. The inner clamping surface 25 is obliquely inclined in such a manner that its upper portion is located more distal from a longitudinal centre line of the vehicle than its lower end. The angle between the clamping surface 25 and the longitudinal direction of the load carrier strut may lie in the range of between 40 and 75°.

On the Drawings, the outer portion 24 of the clamping surface of the outer clamping jaw 3 is either arched or divided into different part surfaces which make an angle with one another. In this instance, the upper part surface is "slightly more horizontal" than the lower part surface.

While not being apparent from the Drawings, the guide portion 6 may be provided with a clamping device or locking device by means of which the inner clamping jaw 4 may be secured at any optional vertical height in relation to the guide portion.

A further alternative resides in the fact that one of the inner jaw 4 or the guide portion 6 is provided with grooves which are parallel with the support surface 7, while the guide portion or jaw, respectively, has projections which snap into the grooves. The inner jaw 4 is hereby slidable along the guide or support surface 7, at the same time as the inner jaw 4 is interconnected with the guide portion 6.

WHAT IS CLAIMED IS:

1. An apparatus for securing a load carrier strut (1), extending transversely over a vehicle roof, in so-called railings (5) disposed along
5 opposing side edge regions of the vehicle roof and in the longitudinal direction of the vehicle, and comprising two clamping jaws (3, 4) reciprocally movable in relation to one another along the load carrier strut under the action of a clamping device, the clamping jaws having clamping surfaces (23 - 25) for engagement with the railing (5), the clamping device being designed
10 for locking the clamping jaws in optional positions along the load carrier strut, characterized by a guide portion (6) which, for its displacement along the load carrier strut (1), is connected to the clamping device, and which has a guide surface (7) for cooperation with the one clamping jaw (4) so that this is movable transversely of the load carrier strut (1) towards and away from
15 the strut.
2. The apparatus as claimed in Claim 1, characterized in that the other clamping jaw (3) has a ramp surface (20) approximately extending in the longitudinal direction of the load carrier strut (1), and making an angle with
20 this longitudinal direction, said ramp surface being disposed for cooperation with the first clamping jaw (4) and displacement thereof transversely of the longitudinal direction of the load carrier strut on mutual relative movement of the clamping jaws in the longitudinal direction of the load carrier strut.
- 25 3. The apparatus as claimed in Claim 2, characterized in that the end of the ramp surface (20) facing the first clamping jaw (3) is located more proximal the load carrier strut (1) than its opposite end.
4. The apparatus as claimed in Claim 2 or 3, characterized in that the angle
30 between the ramp surface (20) and the longitudinal direction of the load carrier strut (1) lies in the range of 10-35°.
5. The apparatus as claimed in Claim 4, characterized in that the angle
35 carrier strut is approximately 20°.

6. The apparatus as claimed in any of Claims 1 to 5, characterized in that the guide portion (6) is, in a horizontal cross section, approximately U-shaped, where the bottom of the U forms a support surface (7) against which the first clamping jaw (4) rests and is slidable on tightening of the clamping jaws (3 and 4) towards one another.

7. The apparatus as claimed in Claim 6, characterized in that the support surface (7) is somewhat obliquely inclined in relation to a normal to the longitudinal direction of the load carrier strut (1) so that its lower end is located more distal from the longitudinal centre line of the vehicle than its upper end.

8. The apparatus as claimed in any of Claims 6 or 7, characterized in that the first clamping jaw (4) is, by anchorage means, securable to the support surface (7) in an optional position along the length (height) thereof.

9. The apparatus as claimed in any of Claims 6 to 8, characterized in that the guide portion (6) and the first clamping jaw (4) have mutually engaging guide means, by which the clamping jaw is slidable along the support surface (7), and the clamping jaw and guide portion are interconnected.

10. The apparatus as claimed in any of Claims 1 to 9, characterized in that the clamping device includes a screw (13) which is axially fixed in and rotary in relation to either of the clamping jaws (3, 4), and a nut (18) in mesh with the screw, the nut being connected to the remaining clamping jaw (3, 4, respectively).

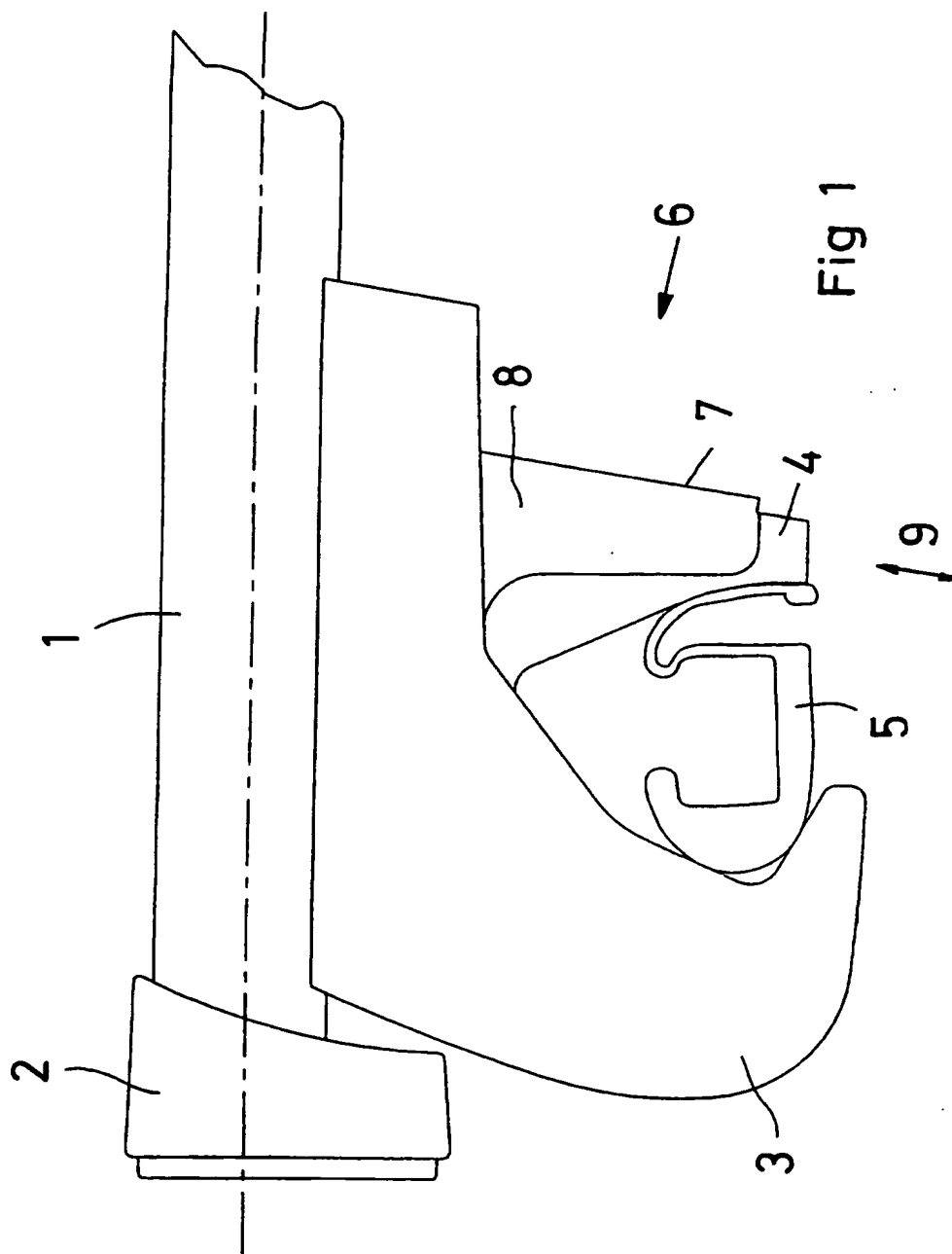
11. The apparatus as claimed in Claim 10, characterized in that the nut (18) is secured in the guide portion (6).

12. The apparatus as claimed in any of Claims 1 to 11, characterized in that the clamping device is disposed interiorly in the load carrier strut.

13. The apparatus as claimed in Claim 11, characterized in that the other clamping jaw (3) and the guide portion (6) have neck portions (10, 16, respectively) which are located in an elongate aperture (11) in the lower

defining wall of the load carrier strut (1).

14. The apparatus as claimed in any of Claims 1 to 13, characterized in that the clamping surfaces (23 -25) are formed to define therebetween an accommodation space for the railing (5), said accommodation space being substantially triangular, with the apex facing upwards.



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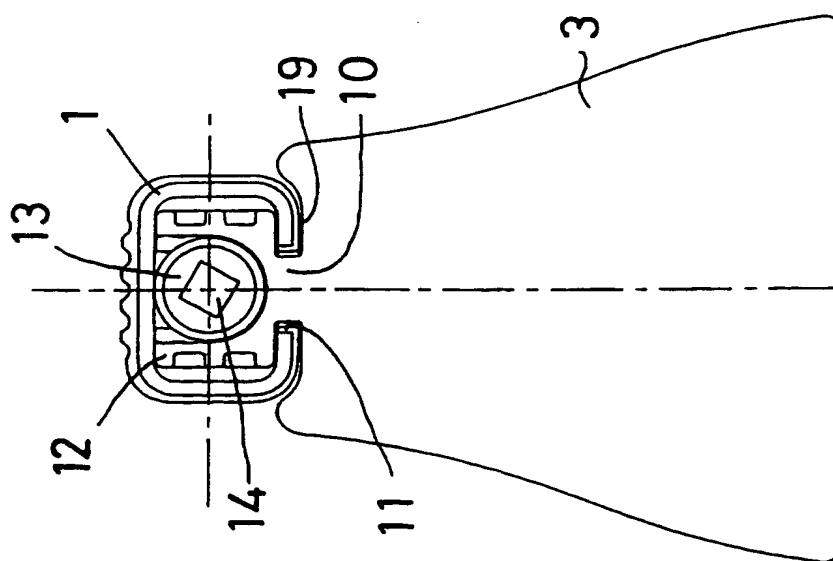


Fig 2

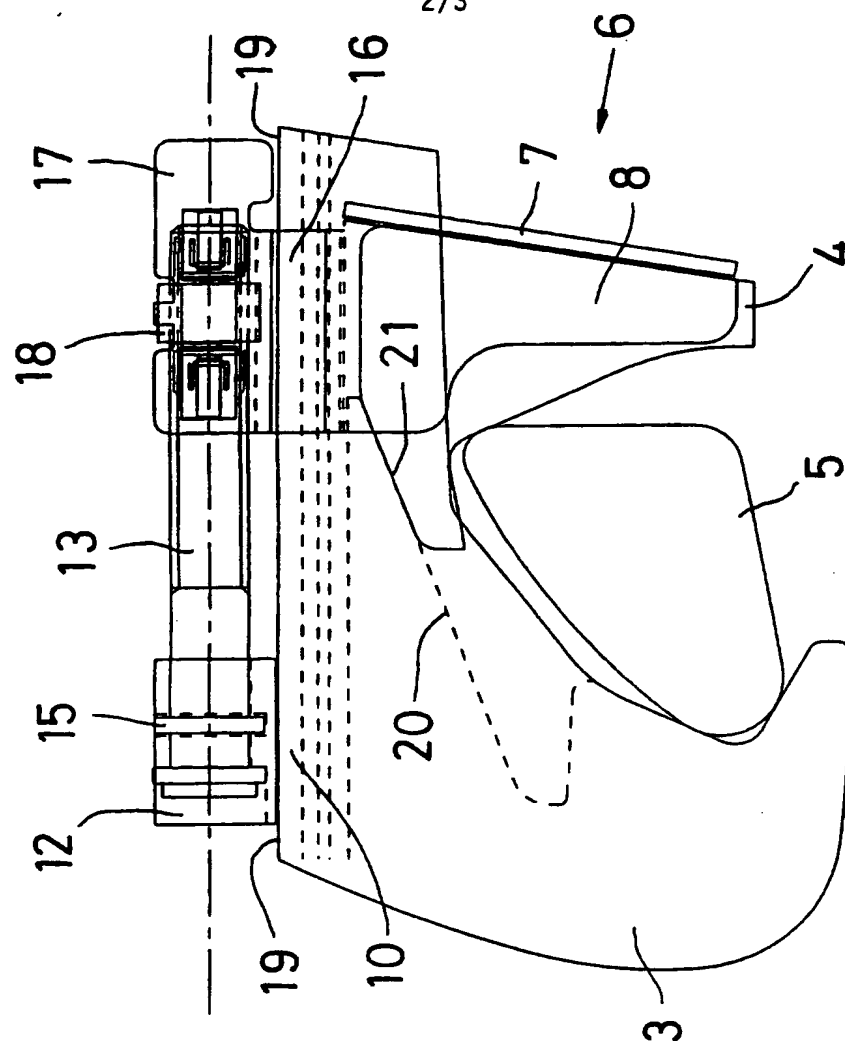


Fig 3

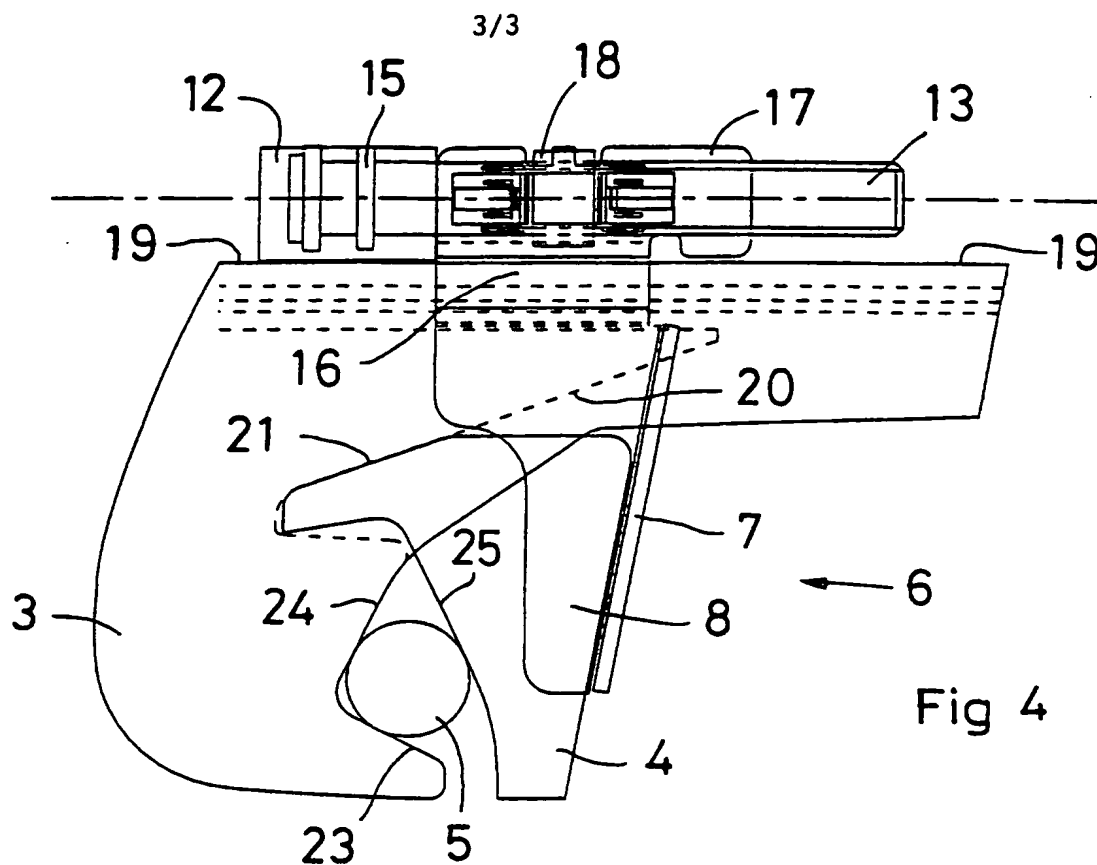


Fig 4

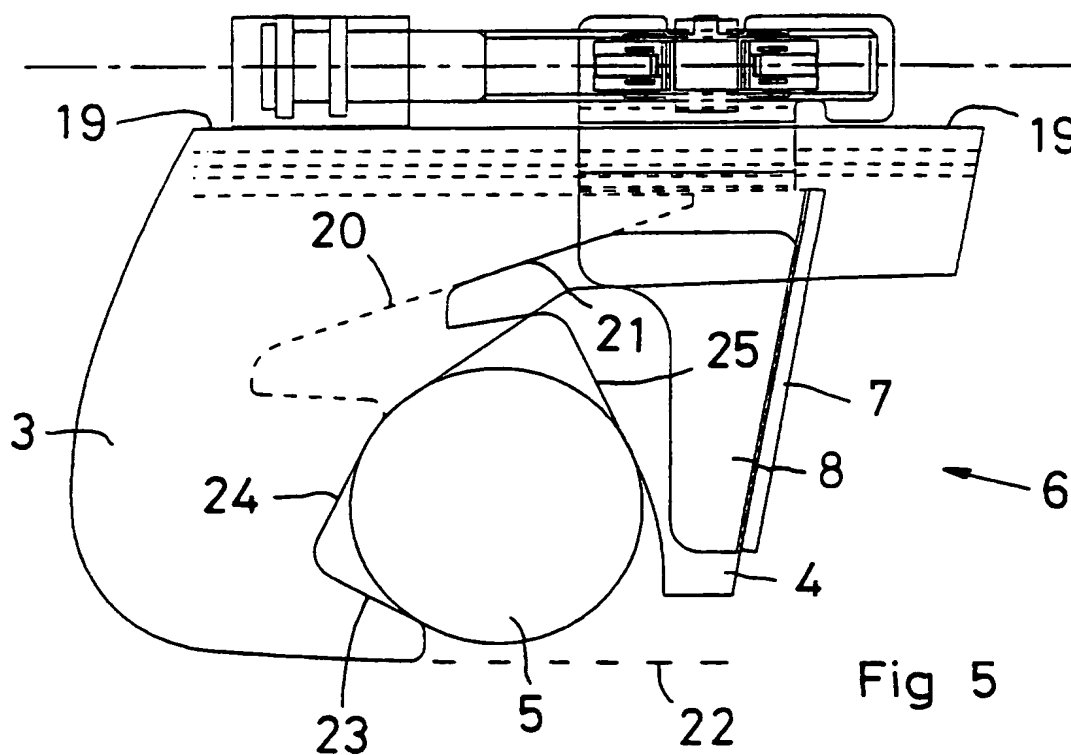


Fig 5

INTERNATIONAL SEARCH REPORT

International application N .

PCT/SE 97/01414

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: B60R 9/04

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B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	WO 9624509 A1 (INDUSTRI AB THULE), 15 August 1996 (15.08.96) --	1,10
A	EP 0487132 A1 (MOMO S.P.A.), 27 May 1992 (27.05.92) --	1,10,14
A	EP 0503305 A1 (VOTEX GMBH), 16 Sept 1992 (16.09.92) --	1,10,12

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Date of the actual completion of the international search

9 October 1997

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11-12-1997

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Information on patent family members

01/09/97

International application No.

PCT/SE 97/01414

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INTERNATIONAL SEARCH REPORT

International application N .
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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim N .
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